

Do transsexuals have micturition disorders?

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Abstract

Objective: Transsexualism occurs with an estimated prevalence of 2.4:100 000 male-to-female (MTF) and 1:100 000 female-to-male (FTM) transsexuals.

As sex reassignment surgery involves surgery of the urethra and transsexuals are substituted life-long with the cross gender hormones there could possibly arise micturition disorders. Aim of the study was to determine if transsexuals have an increased risk of micturition disorders and if so which.

Study Design: Between January and July 2003 we examined 25 transsexuals whereof 18 were MTF and 7 were FTM transsexuals using King's Health Questionnaire, visual analogue scale for patient's well being, perineal and transabdominal ultrasound, urine dipstick and uroflow measurement.

Results: 17 out of 25 patients considered themselves very happy. In MTF transsexuals, a diverted stream, overactive bladder and stress urinary incontinence was a common problem. Prostate volume was small with 20 g and palpation did not confirm and solid or suspicious lesions. None of the patients had significant residual urine but MTF transsexuals had a reduced urinary flow.

We could not detect a current urinary tract infections in any of the patients.

Conclusion: Transsexuals have an increased risk for the development of micturition disorders including stress urinary incontinence and overactive bladder compared to age-matched control groups and should be counselled preoperatively. Reasons for the development of incontinence might be surgery including pudendal nerve damage, hormonal reasons and ageing.

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1. Introduction

Ever since gender identity disorders have been known the exact terminology has been controversial. In the International Classification of Diseases (ICD-10) 'Transsexualism' is described as a desire to live and be accepted as a member of the opposite sex, usually accompanied by a sense of discomfort with, or inappropriateness of, one's anatomic sex, and a wish to have surgery and hormonal treatment to make one's body as congruent as possible with one's preferred sex [1].

Based on legal applications for sex change (1981–1990) the estimated prevalence over 10 years in the former Federal Republic of Germany is 2.4:100 000 male-to-female

transsexuals (MTF) and 1.0:100 000 female-to-male (FTM) transsexuals [2,3]. In other European countries higher prevalences have been reported such as The Netherlands with 8.4:100 000 MTF and 3.3:100 000 FTM transsexuals [4].

The causes of gender identity disorders are still unexplained. Psychological, sociological and somatic origins have been discussed, until now none of them have been clearly proven [5,6]. Recent studies by Swaab et al. postulate that gender identity disorders are associated with structural and functional changes of the hypothalamus and other limbic structures [7].

After the diagnosis transsexualism has been confirmed by psychological assessment and a real-life-test the therapy with lifelong crossgender hormones can be started. The hormonal treatment for FTM transsexuals is androgens. MTF transsexuals are prescribed oestrogens, often in

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combination with the antiandrogen cyproteronacetate or with spironolacton which show synergistic and modulating effects to oestrogens [8,9].

Sex reassignment surgery includes hysterectomy and oophorectomy for FTM transsexuals. Phalloplasty still does not meet a standard as it often is associated with complications [10–14] and is aesthetically and functionally often unsatisfactory [15]. In MTF transsexuals resection of the penis shaft and removal of testes is performed. Inverted penile skin is used for creating a neovagina. The prostate stays in situ while the urethra is shortened [16,17].

Investigations about the impact of sex reassignment surgery on the lower urinary tract have so far concentrated on direct postoperative urological complications. These are in FTM transsexuals with phalloplasty mainly fistulas, urethral strictures or infections [10–14]. In MTF transsexuals investigations concerning micturition disorders are uncommon as there is no need to create a neourethra. However, in urethral stenosis, infections, spraying of the urinary stream and incontinence have been reported immediately post-operatively [17–19]. No prospective long-term data on micturition in transsexuals are available so far.

On the one hand these patients are prone to urethral stenosis due to penile reconstruction be it in FTM but also MTF because large parts of the urethra are cut off, on the other hand the development of the prostate and the male sphincter under cross hormonal substitution is unclear which could promote urinary stress incontinence.

Aim of the study was to find out if transsexuals have micturition disorders and – if so – which, how satisfied they are with the current situation and how the prostate reacts to a life long substitution with cross gender hormones. We were aiming at long-term postoperative data.

2. Patients and methods

Between January and July 2003 we invited transsexuals from the department of endocrinology. We questioned and examined 25 transsexuals whereof 18 were male-to-female transsexuals (MTF) and 7 female-to-male (FTM) transsexuals. Demographic data are shown in Table 1.

We took the medical history, used a visual analogue scale (VAS) to determine patient's satisfaction with the current state and asked them to fill in the King's Health Questionnaire which is validated in German.

We examined the patients clinically and performed perineal ultrasound to determine prostate size, transabdom-

inal ultrasound to measure residual urine, uroflow and urine dipstick.

For perineal ultrasound we used a curved array 3.5–5 MHz probe C 40 S Sonoline Adara, Siemens® which was applied on the introitus using light pressure. The same probe was used for residual urine measurement. Residual urine of less than 100 ml was considered normal.

For uroflow measurement we used Sedia SE8 Flowmeter and for dipstick we used Combur 9 test by Roche®. Maximum flow larger than 20 ml/s was considered normal, between 15 and 19 was considered slightly decreased and less than 15 was seen as decreased.

Patients were recruited from the Department of Endocrinology, Frauenklinik, who had been operated mainly outside of Bern in other parts of Switzerland, France and Germany and who were seen for their hormonal substitution.

Ethical consent was achieved.

For statistics, Graph Pad InStat 3 for Windows was used.

3. Results

All 18 MTF had their sex reassignment including removal of their testes, and formation of a neovagina using inverted penile skin. One patient had his prostate removed due to infection and 10 had further reconstructive surgery of the external genitalia and urethra.

All seven FTM had hysterectomy and oophorectomy as well as breast removal, four of them had phalloplasty without urethral reconstruction. Initially one of them had a urethral diversion through the phalloplasty but had to have this redone due to recurrent infection. Three had no phalloplasty at all. Operations were performed by eight different surgeons in eight centres.

All patients were hormonally substituted.

All MTF but one were substituted with oestradiol. Three were on Finasterid, an alpha-blocking substance for voiding disorders, and three patients had additionally Cyproteronacetate as antiandrogenic substance. One MTF had no current hormonal therapy because of general health deterioration including multiple heart attacks. All FTM had testosterone using parenteral substitution in six cases and one testosterone capsules.

Patients contentness with their current situation is shown in Table 2.

The ones who were unhappy had mainly a problem with a diverted stream, feeling of residual urine, recurrent urinary infections (more than 2/year) and stress urinary incontinence. Details are given in Table 3.

Table 1
Demographic data

	All	MTF	FTM
Age at sex-reassigning operation (median, years)	29	35	26
Age at follow up (median, years)	45	48	38
Follow up (median, years)	16	13	12

Table 2
Patients' contentness (VAS)

	All (n = 25)	MTF (n = 18)	FTM (n = 7)
Very happy	17 (68%)	10 (55%)	7 (100%)
Intermediate	6 (24%)	6 (33%)	0
Unhappy	2 (8%)	2 (11%)	0

Table 3

Patients' history: main complaints

	All (n = 25)	MTF (n = 18)	FTM (n = 7)
Diverted stream	10 (40%)	9 (50%)	1 (14%)
Feeling of incomplete emptying	5 (20%)	4 (22%)	1 (14%)
Recurrent urinary tract infections (<2/year)	4 (16%)	4 (22%)	0
Long micturition time	4 (16%)	4 (22%)	0
Stress urinary incontinence	4 (16%)	3 (16%)	1 (14%)
Overactive bladder	2 (8%)	1 (6%)	1 (14%)
Hematuria	1 (4%)	1 (6%)	0

King's Health Questionnaire showed hyperactive bladder to be the main problem and urinary stress incontinence. Few patients were socially disturbed by their micturition.

Eleven patients were sexually active and none of them was troubled in their sexual life by their bladder problems. Enuresis was a problem in one patient only. MTF could interrupt their urinary stream in 11 cases, 3 could interrupt their stream but with difficulty and 4 were unable to interrupt their stream. All FTM could interrupt their stream without difficulty.

Table 4 gives an overview of the results of King's Health Questionnaire results.

Fig. 1 shows the correlation between the patient's history and the results of the King's Health questionnaire.

The correlation showed an *R* squared test of 47.93% with a *p* value of 0.0848 which was not quite significant.

There was no significant correlation with the patients' contentness measured with the visual analogue scale and micturition symptoms given by the King's Health Ques-

tionnaire; correlation coefficient *r* was 0.9946 with a *p* value of 0.0664 which was not statistically significant.

Clinical examination was possible in all MTF and in 4 FTM. Three FTM were reluctant to be clinically examined and refused this.

Evident urethral scar formation was remarkable in 14 MTF and in 1 FTM. Prostate volume by palpation was 20 g in median (range 10–30 g). At palpation we never had suspicious findings of the prostate. Palpation was not painful in any of the MTF patients.

Perineal ultrasound confirmed prostate volumes of 5 cm³ in median (range 1.1–7.6 cm³).

None of the patients had significant residual urine. Table 5 describes uroflow with micturition time and maximum flow.

MTF had a slightly decreased flow rate, flow rate in FTM was normal.

Urine dipstick never demonstrated a urinary tract infection.

Table 4

Results of the King's Health questionnaire: number of patients with the following complaints

	All (n = 25)	MTF (n = 18)	FTM (n = 7)
Overactive bladder	14	12	2
Stress urinary incontinence	6	6	0
Obstruction	10	6	4
Social embarrassment	5	4	1
Sexual function ^a	0	0	0
Enuresis	1	1	0
UTI ^b	6	5	1

^a Eleven patients only sexually active.

^b UTI = urinary tract infection.

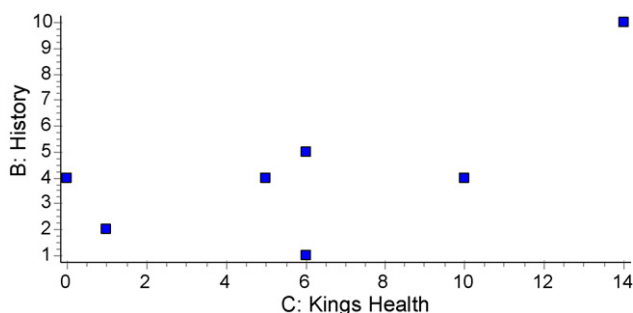


Fig. 1. Correlation between patient's history and King's Health Questionnaire.

4. Discussion

Micturition is a problem in transsexuals after sex reassignment operations, and patients who consider sex reassignment should be informed about this side effect preoperatively.

The 33% of our MTF transsexuals reported to be incontinent which is almost double as much as another study in Medicare beneficiaries from Tucson demonstrated: the prevalence was 20% in men [20]. We can only speculate about the reasons for this increased incontinence.

As only half of the MTF transsexuals were able to contract their pelvic floor without difficulty there could be a traumatic alteration of the pelvic floors' neural supply by the pudendal nerve due to surgical trauma. In women, pudendal nerve damage e.g. after delivery can lead to stress urinary

Table 5

Uroflow results

	All	MTF	FTM
Peak flow (ml/s) (median, range)	20 (4–41)	18 (4–36)	28 (19–41)
Micturition time (s) (median, range)	30 (15–130)	36 (15–130)	30 (16–46)

incontinence. Unfortunately, we did not objectively examine pelvic floor function with the Oxford grading scale which is a weakness of the study.

A smaller prostate size of the MTF transsexuals compared to their male age group [21] may also have a less protective effect on leakage of urine during increased abdominal pressure.

Another reason for an increased rate of incontinence might be the estrogen replacement therapy itself: as demonstrated in the HERS study estrogen may increase the risk for the development of stress urinary incontinence [30]. This might explain the incontinence in MTF transsexuals or at least add to the problem.

Ko et al. showed that incontinent individuals were more depressed and have worse perceived health [20]. On the contrary, in our study only 10% of MTF transsexuals considered themselves as unhappy with the current situation on a visual analogue scale, and there was no correlation between patients' contentness and micturition symptoms. In transsexuals there are many psychological and somatic influences and comorbidities which possibly affect psychic and somatic well being. The same study stresses that one quarter of the investigated persons only sought medical help for their incontinence. This is a well known problem in incontinent patients as incontinence is still an embarrassing condition for most of the patients. This could well be seen in our patients, too: none of them had seen a medical person to get help for their bladder problems. Another study confirms that 14–27% of patients who perceive urinary incontinence as a personal health problem have not sought medical help yet with large cultural differences [22].

MTF transsexuals had a subnormal maximum urine flow with 18 ml/s and half of them complained about spraying, a diverted stream, a feeling of incomplete emptying and a long micturition time. However, we did not detect significant residual urine of more than 100 ml postvoid residual in any of the patients. The history and flow rates hint at an obstruction which could be caused by a scarred urethral meatus.

Obstruction can be confirmed by pressure flow studies which we did not perform. Obstruction could also explain the high incidence of overactive bladder in more than half of the transsexual patients which is three times higher than in other studies with female patients [23]. There is also an obvious difference if we compare the numbers of patients' complaints of an overactive bladder in the history with the King's Health questionnaire; history and King's Health questionnaire did not correlate. King's Health questionnaire shows far higher rates of overactive bladder than the patients' history where patients used their own words to describe their symptoms which could mean that the questionnaire is more symptom sensitive than the patients' history in their own words; this has been demonstrated before [24].

Long-term effects of oestrogen treatment on the prostate have been examined. MTF transsexuals who are chronically exposed to oestrogens have smaller prostates in comparison to

an age-matched group of men without hormonal treatment [25,26]. Additionally slight urinary discomforts measured by the WHO prostate symptom score have been described [26]. The risk of developing a prostate carcinoma is small: in a group of 816 MTF transsexuals mortality after treatment with cross-sex hormones was compared to the general population, thereby one case of prostate malignancy was encountered [27]. We did not detect any suspicious clinical or ultrasound finding in our patients though a weakness of the study is that we have not taken PSA values as an additional screening marker for prostate carcinoma. However, other studies described that serum PSA is decreased by chronic oestrogen or cyproterone acetate treatment [25,26,28].

Information about long term effects after sex reassignment surgery can only be found in one recent study by Hoebeke that has analyzed micturition habits and symptoms of the lower urinary tract by giving a questionnaire to 24 FTM and to 31 MTF transsexuals. Additionally uroflowmetry data from 92 FTM transsexuals were reviewed. Thereby minor changes in urinary habits have been observed [29]. This is contradictory to the quality of life assessment with the King's Health Questionnaire of our patients who were indeed disturbed by their incontinence and hyperactive bladder. However, Hoebeke reviewed his patients retrospectively and did not use validated questionnaires which may explain the differences.

One important question which arose after the study was how to treat stress incontinence after sex reassignment operations. Predominant urodynamic stress incontinence was confirmed on multichannel urodynamics in three MTF transsexuals which was arranged after the study. Of those two were improved using conservative therapy with pelvic floor exercises. For the remaining patient, colposuspension was discussed but considered as insufficient because bladder neck hypermobility and intrinsic sphincter deficiency was not the current pathophysiology. A suburethral sling was also not considered as ideal solution as the prostate was still in situ and would be situated between urethra and sling.

Finally transurethral collagen injection was successfully performed and the patient is markedly improved now.

In summary, particularly MTF transsexuals do have micturition disorders as incontinence, overactive bladder and a decreased urinary stream. Patients should be advised about this risk prior to sex reassignment operations particularly in male-to-female transsexuals.

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